

## Types of Quadratic Equation.

A quadratic polynomial  $f(x)$  when equated to zero is called quadratic equation.

Example:  $3x^2 + 7x + 5 = 0, -9x^2 + 7x + 5 = 0, x^2 + 2x = 0, 2x^2 = 0$

or

An equation in which the highest power of the unknown quantity is two is called quadratic equation.

Quadratic equations are of two types:

(1) **Purely quadratic equation:** A quadratic equation in which the term containing the first degree of the unknown quantity is absent is called a purely quadratic equation.

i.e.  $ax^2 + c = 0$  where  $a, c \in \mathbb{C}$  and  $a \neq 0$

(2) **Affected quadratic equation:** A quadratic equation which contains terms of first as well as second degrees of the unknown quantity is called an affected quadratic equation.

i.e.  $ax^2 + bx + c = 0$  where  $a, b, c \in \mathbb{C}$  and  $a \neq 0, b \neq 0$ .

(3) **Roots of a quadratic equation :** The values of variable  $x$  which satisfy the quadratic equation is called roots of quadratic equation.

### Important Tips

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- ☞ An equation of degree  $n$  has  $n$  roots, real or imaginary.
- ☞ Surd and imaginary roots always occur in pairs in a polynomial equation with real coefficients i.e. if  $2 - 3i$  is a root of an equation, then  $2 + 3i$  is also its root. Similarly if  $2 + \sqrt{3}$  is a root of given equation, then  $2 - \sqrt{3}$  is also its root.
- ☞ An odd degree equation has at least one real root whose sign is opposite to that of its last term (constant term), provided that the coefficient of highest degree term is positive.
- ☞ Every equation of an even degree whose constant term is negative and the coefficient of highest degree term is positive has at least two real roots, one positive and one negative.